

Appl. No. 09/918,331
Arndt, Dated September 23, 2005
Reply to Office action of July 26, 2005
Attorney Docket No. P14425-US2
EUS/J/P/05-3229

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1 -2. (Canceled)

3. (Previously Presented) A signaling point in a network signaling system, the network signaling system having a plurality of interconnected signaling points, comprising

a protocol layer for simultaneously providing connectionless and connection-oriented protocol services, wherein the protocol layer is a Signaling Connection Control Part (SCCP) layer and is adapted to handle network management procedures that are identified, distinguished, and applied in the network signaling system on per connectionless and per connection-oriented bases;

wherein the network management procedures comprise procedures to indicate and handle availability status for the connectionless service itself and for a user of the connectionless service, availability status for the connection-oriented service itself and for a user of the connection-oriented service, and availability status for both the connectionless and connection-oriented services and for users of both protocol services.

4. (Previously Presented) The signaling point of claim 3, wherein an availability status comprises at least one of an "Allowed" or available state, a "Prohibited" or unavailable state, and a "Congested" or a predetermined congestion level state, for at least one of the connectionless and connection-oriented services.

5. (Previously Presented) The signaling point of claim 3, wherein an availability status is communicated from a protocol layer at the signalling point to a peer protocol layer at another signalling point by a corresponding management signalling

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message that includes information about an affected signalling point, an affected subsystem number, and an affected protocol service.

6. (Previously Presented) The signaling point of claim 5, wherein a "Subsystem Status Allowed" management message is sent from a protocol layer at a signalling point to a peer protocol layer at another signalling point; the "Subsystem Status Allowed" management message includes an affected protocol service indicator representing at least one protocol service, an affected subsystem number representing either a user of the at least one protocol service or the protocol service itself, and an affected signalling point at which the affected subsystem number resides; and the "Subsystem Status Allowed" message indicates that the affected subsystem number located at the affected signalling point is available to support signalling traffic for the indicated at least one protocol service.

7. (Previously Presented) The signaling point of claim 5, wherein a "Subsystem Status Prohibited" management message is sent from a protocol layer at a signalling point to a peer protocol layer at another signalling point; the "Subsystem Status Prohibited" message includes an affected protocol service indicator representing at least one protocol service, an affected subsystem number representing a user of the at least one protocol service, and an affected signalling point at which the user represented by a subsystem number resides; and the "Subsystem Status Prohibited" message indicates that the affected subsystem number located at the affected signalling point is unavailable to support signalling traffic for the indicated at least one protocol service.

8. (Previously Presented) The signaling point of claim 5, wherein a "SCCP/Subsystem Congestion" management message is sent from a protocol layer at a signalling point to a peer protocol layer at another signalling point; the "SCCP/Subsystem Congestion" message includes an affected protocol service indicator representing at least one protocol service, an affected subsystem number representing

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either a user of the at least one protocol service or the protocol service itself, a congestion level that the indicated protocol service or the user has reached, and an affected signalling point at which the affected subsystem number resides; and the "SCCP/Subsystem Congested" message indicates that the affected subsystem number located at the affected signalling point has reached the indicated congestion level for supporting signalling traffic for the indicated at least one protocol service.

9. (Previously Presented) The signaling point of claim 5, wherein a "Subsystem Status Test" management message is sent from a protocol layer at a signalling point to a peer protocol layer at another signalling point; the "Subsystem Status Test" message includes an affected protocol service indicator representing at least one protocol service, an affected subsystem number representing either a user of the at least one protocol service or the protocol service itself, and an affected signalling point at which the affected subsystem number resides; and the "Subsystem Status Test" message queries about an availability status of the affected subsystem number located at the affected signalling point to support signalling traffic for the indicated at least one protocol service.

10. (Previously Presented) The signaling point of claim 5, wherein a "Subsystem Out of service Request" (SOR) management message is sent from a protocol layer at a signalling point to a peer protocol layer at another signalling point; the "Subsystem Out of service Request" message includes an affected protocol service indicator representing at least one protocol service, an affected subsystem number representing either a user of the at least one protocol service or the protocol service itself, and an affected signalling point at which the affected subsystem number resides; and the "Subsystem Out of service Request" message requests a backup subsystem to handle signalling traffic for the indicated affected protocol service that was initially addressed to the affected subsystem number located at the affected signalling point.

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11. (Previously Presented) The signaling point of claim 5, wherein a "Subsystem Out of service Granted" (SOG) management message is sent from a protocol layer at a signalling point to a peer protocol layer at another signalling point; the "Subsystem Out of service Granted" message includes an affected protocol service indicator representing at least one protocol service, an affected subsystem number representing either a user of the at least one protocol service or the protocol service itself, and an affected signalling point at which the affected subsystem number resides; and the "Subsystem Out of service Granted" message indicates an acceptance to act as a backup subsystem to handle signalling traffic for the indicated affected protocol service that was initially addressed to the affected subsystem number located at the affected signalling point.

12. (Previously Presented) The signaling point of claim 3, wherein availability status is communicated from a protocol layer at a signalling point to a user of the protocol layer at the signalling point by a corresponding management signalling primitive that includes information about the affected signalling point, the affected subsystem number, and the affected protocol service representing at least one protocol service.

13. (Previously Presented) The signaling point of claim 3, wherein availability status is communicated from a user of a protocol layer at a signalling point to the protocol layer at the signalling point by a corresponding management signalling primitive that includes information about the affected signalling point, the affected subsystem number, and the affected at least one protocol service.

14. (Previously Presented) The signaling point of claim 3, wherein the network management procedures include applying signalling traffic restrictions for outgoing traffic originated by a local user or relayed from another signalling node due to congestion or changes in availability status of an adjacent signalling node on per connectionless and per connection-oriented bases.

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15. (Previously Presented) The signalling point of claim 3, wherein the network management procedures include applying signalling traffic restrictions for incoming traffic from adjacent signalling nodes due to congestion or changes in availability status in a signalling node on per connectionless and per connection-oriented bases.

16. (Previously Presented) A method of applying network management procedures in a signalling network that includes a plurality of interconnected signalling points, each signalling point having a protocol layer that is able to simultaneously offer connectionless and connection-oriented protocol services and that is adapted to handle network management procedures, the method comprising:

- a) determining a change of availability status for at least one of the protocol services;
- b) updating a corresponding availability status table for the at least one protocol service;
- c) informing a peer protocol layer at a remote signalling point about the change of availability status for the at least one protocol service;
- d) querying the peer protocol layer at the remote signalling point about a present value of availability status for the at least one protocol service;
- e) co-ordinating a backup user at a remote signalling node to handle signalling traffic initially intended for an indicated affected subsystem at the indicated signalling point and for the indicated protocol service representing at least one protocol service;
- f) applying signalling traffic restrictions for outgoing traffic originated by a local user or relayed from another signalling node due to congestion or a change in availability status on an adjacent signalling node on a per protocol service basis; and
- g) applying signalling traffic restrictions for incoming traffic from adjacent signalling nodes due to congestion or a change in availability status on an own signalling node on a per protocol service basis; wherein the network management

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procedures are identified, distinguished, and applied on per connectionless and per connection-oriented bases.

17. (Original) The method of claim 16, wherein the protocol layer is a Signalling Connection Control Part layer.

18. (Original) The method of claim 17, wherein step a) includes determining a change of availability status based on at least one of a user of the at least one protocol service and the at least one protocol service itself.

19. (Original) The method of claim 17, wherein step b) comprises updating the corresponding availability status table based on at least one of a user of the at least one protocol service and the at least one protocol service itself.

20. (Original) The method of claim 18, wherein a user of the at least one protocol service and the at least one protocol service itself can be located at the own signalling node or at a remote signalling node.

21. (Original) The method of claim 19, wherein a user of the at least one protocol service and the at least one protocol service itself can be located at the own signalling node or at a remote signalling node.

22. (Original) The method of claim 17, wherein step c) comprises informing peer protocol layers at remote signalling points about changes in availability status of at least one of a user of the at least one protocol service and the at least one protocol service itself.

23. (Original) The method of claim 22, wherein a protocol layer at a remote signalling point is informed about a change of availability status through a

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corresponding SCCP management message that includes an identifier of the protocol service for which the change of availability status occurred.

24. (Original) The method of claim 17, wherein step d) comprises querying a peer protocol layer at a remote signalling point about a current value of availability status of at least one of its own users of the at least one protocol service and the at least one protocol service itself.

25. (Original) The method of claim 17, wherein step e) comprises the steps of: e1) requesting, by a local user, an indicated backup subsystem at a remote signalling node to deal with signalling traffic for an indicated protocol service initially addressed to the local user; e2) informing a peer protocol layer at the remote signalling point about the request for backup for the indicated protocol service; e3) requesting, by the peer protocol layer at the remote signalling point, its indicated user to act as backup of the local subsystem for the indicated protocol service; e4) answering, by the indicated user, with an acceptance to the peer protocol layer for the indicated protocol service; e5) granting, by the peer protocol layer, the backup subsystem to the local protocol layer to handle traffic addressed to the local protocol user for the indicated protocol service; and e6) informing, by the local protocol layer, the local user of the granted backup subsystem to handle signalling traffic addressed to the local user for the indicated protocol service.

26. (Original) The method of claim 17, wherein step f) comprises comparing and treating the remote affected congestion level, the remote restriction level, and the remote restriction sub-Level on a per protocol service basis.

27. (Original) The method of claim 17, wherein step g) comprises comparing and treating the local congestion level, the local restriction level, and the local restriction sub-Level on a per protocol service basis.

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28. (Original) An apparatus for applying network management procedures in a signalling network that includes a plurality of interconnected signalling points, each signalling point including a protocol layer that is able to simultaneously offer connectionless and connection-oriented protocol services and that is adapted to handle network management procedures supported on per connectionless and per connection-oriented bases, the apparatus comprising:

means for determining a change of availability status for at least one of the protocol services;

a memory in which availability status, including a congestion measurement, for at least one of the protocol services can be stored;

means for informing a peer protocol layer at a remote signalling point about a change of availability status or a congestion measurement for at least one protocol service;

means for querying a peer protocol layer at a remote signalling point about a present value of availability status or congestion measurement for at least one protocol service;

means for co-ordinating a backup user at a remote signalling node to handle signalling traffic initially intended for an indicated affected subsystem at an indicated signalling point and for an indicated protocol;

means for applying a signalling traffic restriction for outgoing traffic originated by a local user or relayed from another signalling node due to congestion or a changes of availability status on an adjacent signalling node on a per protocol service basis; and

means for applying a signalling traffic restriction for incoming traffic from an adjacent signalling node due to congestion or a change of availability status on an own signalling node on a per protocol service basis.

29. (Original) The apparatus of claim 28, wherein the protocol layer is able to simultaneously offer connectionless and connection-oriented services, and the apparatus further comprises means for distinguishing the management procedures on

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per connectionless and per connection-oriented bases, the distinguishing means residing at a signalling connection control part layer.

30. (Currently Amended) A signalling point having means for applying network management procedures in a network signalling system that comprises a plurality of interconnected signalling points, the signalling point comprising

a protocol layer that operates in accordance with a Signalling Connection Control Part (SCCP) to simultaneously offer connectionless and connection-oriented protocol services and to handle the network management procedures, wherein the protocol layer includes means to distinguish the network management procedures on per connectionless and connection-oriented basis, the distinction performed by setting a protocol service identifier in connection with an availability status, and the network management procedures comprising procedures to indicate and handle

availability status for the connectionless protocol service itself as well as for users of said connectionless protocol service,

availability status for the connection-oriented protocol service itself as well as for users of said connection-oriented protocol service, and

availability status for both connectionless and connection-oriented protocol services as well as for users of both protocol services

31. (Canceled)

32. (Previously Presented) The signalling point of claim 30, wherein the availability status comprises at least one of an "Allowed" or available state, a "Prohibited" or unavailable state, and a "Congested" state with a given congestion level, for at least one of the connectionless and connection-oriented protocol services.

33. (Previously Presented) The signalling point of claim 30, wherein the protocol layer includes:

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means for determining a change of availability status at an affected signalling point for at least one protocol service;

storage in which availability status, including a congestion measurement, can be stored for at least one protocol service; and

means for informing a peer protocol layer at a remote signalling point about a change of availability status at the affected signalling point for the at least one protocol service.

34. (Previously Presented) The signalling point of claim 33, wherein the protocol layer further comprises means for auditing, in co-operation with a peer protocol layer at a remote signalling point, about a present value of an availability status at an affected signalling point for at least one protocol service.

35. (Previously Presented) The signalling point of claim 33, wherein the means for informing a peer protocol layer at a remote signalling point includes means for sending a "Subsystem Status Allowed" (SSA) management message to said peer protocol layer, the "Subsystem Status Allowed" management message comprising an affected protocol service identifier representing at least one protocol service, an affected subsystem number representing either a user of the at least one protocol service or the protocol service itself, and an affected signalling point at which the affected subsystem number resides; and said "Subsystem Status Allowed" indicating that the affected subsystem number located at the affected signalling point is available to support signalling traffic for the indicated at least one protocol service.

36. (Previously Presented) The signalling point of claim 33, wherein the means for informing a peer protocol layer at a remote signalling point includes means for sending a "Subsystem Status Prohibited" (SSP) management message to said peer protocol layer, the "Subsystem Status Prohibited" management message comprising an affected protocol service identifier representing at least one protocol service, an affected subsystem number representing a user of the at least one protocol service, and an

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affected signalling point at which the user represented by the subsystem number resides; and said "Subsystem Status Prohibited" indicating that the affected subsystem number located at the affected signalling point is unavailable to support signalling traffic for the indicated at least one protocol service.

37. (Previously Presented) The signalling point of claim 33, wherein the means for informing a peer protocol layer at a remote signalling point includes means for sending an "SCCP/Subsystem Congestion" (SSC) management message to said peer protocol layer, the "SCCP/Subsystem Congestion" management message comprising an affected protocol service identifier representing at least one protocol service, an affected subsystem number representing either a user of the at least one protocol service or the protocol service itself, a congestion level that the indicated protocol layer or user has reached, and an affected signalling point at which the user or protocol layer represented by the subsystem number resides; and said "SCCP/Subsystem Congested" indicating that the affected subsystem number located at the affected signalling point reaches the indicated congestion level to support signalling traffic for the indicated at least one protocol service.

38. (Previously Presented) The signalling point of claim 34, wherein the means for auditing in co-operation with a peer protocol layer at a remote signalling point includes a "Subsystem Status Test" (SST) management message sent to, or received from, said peer protocol layer, the "Subsystem Status Test" management message comprising an affected protocol service identifier representing at least one protocol service, an affected subsystem number representing either a user of said at least one protocol service or the protocol service itself, and an affected signalling point at which the affected subsystem number resides; and said "Subsystem Status Test" querying about the availability status of the affected subsystem number located at the affected signalling point to support signalling traffic for the indicated at least one protocol service.

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39. (Previously Presented) The signalling point of claim 30, wherein the protocol layer includes means for coordinating a backup user with a peer protocol layer at a remote signalling point to handle signalling traffic initially intended for an indicated affected subsystem at an indicated signalling point, for an indicated protocol service representing at least one protocol service.

40. (Previously Presented) The signalling point of claim 39, wherein the means for coordinating a backup user with a peer protocol layer at a remote signalling point includes means for exchanging a "Subsystem Out of service Request" (SOR) management message with said peer protocol layer, the SOR comprising an affected protocol service identifier representing at least one protocol service, an affected subsystem number representing a user of the at least one protocol service, and an affected signalling point at which the affected subsystem number resides; and said "Subsystem Out of service Request" requesting a backup subsystem to handle signalling traffic for the indicated affected protocol service, signalling traffic that was initially addressed to the affected subsystem number located at the affected signalling point.

41. (Previously Presented) The signalling point of claim 40, wherein the means for coordinating a backup user with a peer protocol layer at a remote signalling point includes means for exchanging a "Subsystem Out of service Granted" (SOG) management message with said peer protocol layer, the SOG comprising an affected protocol service identifier representing at least one protocol service, an affected subsystem number representing a user of the at least one protocol service, and an affected signalling point at which the affected subsystem number resides; and said "Subsystem Out of service Granted" indicating an acceptance to act as a backup subsystem to handle signalling traffic for the indicated affected protocol service, signalling traffic that was initially addressed to the affected subsystem number located at the affected signalling point.

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42. (Previously Presented) The signalling point of claim 33, wherein the protocol layer further comprises means for applying signalling traffic restrictions for the traffic in the direction of the affected signalling point due to a change in its availability status on a per protocol service basis.

43. (Previously Presented) The signalling point of claim 30, wherein the availability status is communicated from the protocol layer to a user of the protocol layer by a corresponding management signalling primitive that comprises information about an affected signalling point, an affected subsystem number, and an affected protocol service identifier representing at least one protocol service.

44. (Previously Presented) The signalling point of claim 30, wherein the availability status is communicated from a user of the protocol layer to the protocol layer by a corresponding management signalling primitive that comprises information about the affected signalling point, the affected subsystem number, and the affected protocol service identifier representing at least one protocol service.

45. (Currently Amended) A method of applying network management procedures in a signalling network that includes a plurality of interconnected signalling points, each signalling point having a protocol layer operating in accordance with a Signalling Connection Control Part (SCCP) to simultaneously offer connectionless and connection-oriented protocol services and to handle network management procedures, the method comprising a step of

distinguishing the network management procedures on per connectionless and connection-oriented basis, the distinction performed by

setting a protocol service identifier in connection with an availability status;
determining a change of availability status at an affected signalling point for at least one of the protocol services;
updating a corresponding availability status table for the at least one protocol service; and

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informing a peer protocol layer at a remote signalling point about a change of availability status at the affected signalling point for the at least one protocol service.

46. (Canceled)

47. (Previously Presented) The method of claim 46, wherein the step of determining a change of availability status includes at least one of the following steps:

determining a change in availability status of at least one user of the at least one protocol service; and

determining a change in availability status of the at least one protocol service itself.

48. (Previously Presented) The method of claim 46, wherein the step of updating a corresponding availability status table includes at least one of the following steps:

updating the corresponding availability status table for at least one user of the at least one protocol service; and

updating the corresponding availability status table for the at least one protocol service itself.

49. (Previously Presented) The method of claim 46, wherein the step of informing a peer protocol layer about a change of availability status includes at least one of the following steps:

informing a peer protocol layer at a remote signalling point about a change in availability status of at least one user of the at least one protocol service; and

informing a peer protocol layer at a remote signalling point about a change in availability status of the at least one protocol service itself.

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50. (Previously Presented) The method of claim 46, further including a step of auditing, in co-operation with a peer protocol layer at a remote signalling point, about a present value of an availability status at an affected signalling point for at least one protocol service.

51. (Previously Presented) The method of claim 50, wherein the step of auditing about a present value of an availability status includes at least one of the following steps:

querying a peer protocol layer at a remote signalling point about a current value of availability status for at least one own user of the at least one protocol service; and

querying a peer protocol layer at a remote signalling point about a current value of availability status for the at least one own protocol service itself.

52. (Previously Presented) The method of claim 45, wherein the step of distinguishing the network management procedures on a per connectionless and connection-oriented basis includes a step of coordinating a backup user with a peer protocol layer at a remote signalling node to handle signalling traffic initially intended for an indicated affected subsystem at an indicated signalling point, for an indicated protocol service identifier representing at least one protocol service.

53. (Previously Presented) The method of claim 52, wherein the step of coordinating a backup user with a peer protocol layer includes the steps of:

a local user requesting an indicated backup subsystem at a remote signalling node to deal with signalling traffic for an indicated protocol service initially addressed to said local user;

informing a peer protocol layer at the remote signalling point about the request for backup for the indicated protocol service;

the peer protocol layer at the remote signalling point requesting its indicated local subsystem to act as backup of the user for the indicated protocol service;

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the local subsystem answering with an acceptance to the peer protocol layer for the indicated protocol service;

the peer protocol layer granting the backup subsystem to the local protocol layer to handle traffic addressed to the local protocol user for the indicated protocol service; and

the local protocol layer informing the local user of the granted backup subsystem to handle signalling traffic addressed to the local user for the indicated protocol service.

54. (Previously Presented) The method of claim 46, further including a step of applying signalling traffic restrictions for outgoing traffic originated by a local user or relayed from another signalling node due to a change in availability status on an adjacent signalling node on a per protocol service basis.

55. (Previously Presented) The method of claim 54, wherein the step of applying signalling traffic restrictions for outgoing traffic includes a step of comparing and treating a remote affected Congestion Level, a remote Restriction Level, and a remote Restriction Sub-Level on a per protocol service basis.

56. (Previously Presented) The method of claim 46, further comprising a step of applying signalling traffic restrictions for incoming traffic from an adjacent signalling node due to a change in availability status on an own signalling node on a per protocol service basis.

57. (Previously Presented) The method of claim 56, wherein the step of applying signalling traffic restrictions for incoming traffic includes a step of comparing and treating a local Congestion Level, a local Restriction Level, and a local Restriction Sub-Level on a per protocol service basis.